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BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Service Rules for the 746-764 and	)	WT Docket No. 99-168
776-794 MHz Bands, and Revision to	)	
Part 27 of the Commission's Rules	)	

To: The Commission

REPLY COMMENTS OF THE U.S. GPS INDUSTRY COUNCIL

THE U.S. GPS INDUSTRY COUNCIL

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SUMMARY

The U.S. GPS Industry Council ("the Council") hereby replies to various comments filed regarding the Commission's notice of proposed rulemaking in this proceeding. The Commission is proposing limits for out-of-band emissions into the Global Positioning System ("GPS") band (*i.e.*, 1559-1610 MHz) from systems operating in the 776-794 MHz band. The proposed limits are the same standards that have been recommended by the National Telecommunication and Information Administration ("NTIA") and proposed by the Commission in other proceedings. Yet, in this proceeding, as well as in the others, the Commission has not provided any technical justification for extending the NTIA-recommended limits to operational scenarios that differ from the specific scenario for which the NTIA limits were developed.

In its initial Comments, the Council demonstrated that the approach of adopting out-of-band emission ("OOBE") limits for the protection of GPS in different proceedings without considering the cumulative effect of the different operations on the GPS bands would be ineffective and would eventually disrupt the acquisition and reliability of GPS signals. The Council, therefore, urged the Commission to take a much broader perspective by adopting a harmonized approach to frequency spectrum management and establishing suitable OOBE levels that would fully protect GPS. In these Reply Comments, the Council shows that many of the commenters in this proceeding have also urged the Commission to adopt comprehensive frequency spectrum management. Indeed, none of the commenters have opposed the adoption of such harmonized spectrum policy.

The Council also emphasizes that most of the commenters did not oppose the specific OOBE levels that the Council has demonstrated to be required to protect the critical safety-of-life applications of GPS. Where a few parties have taken positions in comments that are inconsistent with the Council's, they have based those positions largely on the incorrect assumption that the levels necessary to protect the GPS service are not achievable or for lack of an understanding of the criticality of the GPS service for millions of users. In these Reply Comments, the Council emphasizes that it has demonstrated that the –70 dBW/MHz/-80 dBW/MHz standards do not adequately or universally protect GPS. Indeed, at the present time, it has been established only that the –70 dBW/MHz limit can be applied to MSS handsets operating in the "Big LEO" bands at 1-3 GHz.

The Council also emphasizes that, based on actual studies and demonstrations, the only default level that can safely be established at this point to protect GPS receivers is a wideband OOBE threshold limit of –100 dBW/MHz. This is the level that transmissions systems operating in the 776-794 MHz band must comply with to protect GPS receivers, absent case-by-case independent studies. Higher levels, up to –70 dBW/MHz, may be appropriate in certain instances (such as 1-3 GHz MSS), but only if case-by-case studies are conducted, taking into account the particular operational characteristics and other factors detailed in the Council's initial Comments, and demonstrating conclusively that no increased interference will occur.

The Council also stresses that a threshold level of –100 dBW/MHz is achievable. Indeed, at least one commenter stated that 110 dB suppression of second harmonic emissions from transmitters operating on channels 65-67 falling on the GPS

frequencies is achievable through the use of a frequency "notch" filter. If an alternate band plan that avoids altogether out-of-band emissions into the GPS frequency band is not practical, the Commission should require the use of a "notch" filter to keep marginal increases to the GPS noise floor at a minimum and below harmful levels.

In summary, the Council reiterates that many commenters also urged the Commission to adopt a comprehensive spectrum policy. The Commission should determine the appropriate OOBE levels for systems operating in the 776-794 MHz band within such harmonized policy. If the Commission desires to adopt any OOBE standards at this time, it should adopt a minimum threshold of –100 dBW/MHz, absent case-by-case studies that consider the appropriate factors.

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REPLY COMMENTS OF THE U.S. GPS INDUSTRY COUNCIL

The U.S. GPS Industry Council ("the Council"), by its attorneys and pursuant to Sections 1.415 and 1.419 of the Commission's rules,[1] hereby replies to comments filed in response to the Commission's notice of proposed rule making in the above-captioned proceeding.[2]

I. INTRODUCTION

The Council noted in its initial Comments[3] that the rationale for the Commission's proposed out-of-band emission ("OOBE") standards for systems operating in the 776-794 MHz band[4] appears to be that these same standards were proposed in the

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1 47 C.F.R. §§ 1.415 and 1.419.

2 *Service Rules for the 746-764 and 776-794 MHz Bands, and Revision to Part 27 of the Commission's Rules*, WT Docket No. 99-168 (FCC 99-97), slip op. (released June 3, 1999) ("*NPRM*").

3 Comments of the U.S. GPS Industry Council in WT Docket No. 99-168 (filed July 19, 1999) ("Comments").

4 Those standards were recommended by The National Telecommunications and Information Administration ("NTIA").

Public Safety Spectrum[5] and the *GMPCS MoU*[6] proceedings. There was no showing, however, that the OOBE limits proposed in those proceedings (*i.e.*, -70 dBW/MHz/-80 dBW/MHz) would be sufficient to protect GPS receivers from second harmonic emissions from systems operating at 776-794 MHz.[7] The Council views as fundamentally flawed the Commission's approach of simply proposing OOBE standards that had been proposed in other proceedings, without any technical justification for extending these standards to different frequencies.[8] In particular, the Council noted in its Comments that the Commission failed to consider that a –70 dBW/MHz level would endanger the availability of GPS, and that the cumulative effect from all services operating at emissions of –70 dBW/MHz/-80 dBW/MHz would be devastating for critical safety-of-life GPS applications.[9] Therefore, the Council urged the Commission to take a broader perspective by adopting a comprehensive frequency spectrum management policy to produce suitable OOBE levels that would fully protect GPS.[10]

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5 *Development of Operational, Technical and Spectrum Requirements For Meeting Federal State and Local Public Safety Agency Communications Requirements Through the Year 2010; Establishment of Rules and Requirements of Priority Access Service*, WT Docket No. 96-86, 12 FCC Rcd 17706 (1997) ("*Public Safety Spectrum Second Notice*").

6 *Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite ("GMPCS") Memorandum of Understanding and Arrangements; Petition of the National Telecommunications and Information Administration to Amend Part 25 of the Commission's Rules to Establish Emissions Limits for Mobile and Portable Earth Stations Operating in the 1610-1660.5 MHz Band*, IB Docket No. 99-67 (RM No. 9165) (FCC99-37), slip op. (released March 5, 1999) ("*GMPCS MoU NPRM*").

7 *See* Comments at 3.

8 *See id.* at 3.

9 *See id.* at 4.

10 *See id.* at 7.

As the Commission reviews the many pleadings submitted in connection with its proposals in this proceeding, the Council urges it to keep in mind that many of the commenters have also urged the Commission to adopt comprehensive frequency spectrum management. At the same time, none of the commenters have opposed adoption of such a harmonized spectrum policy. Further, most of the commenters in this proceeding did not oppose the specific OOBE levels that the Council has demonstrated to be required to protect the critical safety-of-life applications of GPS.

Where a few parties have taken positions in comments that are inconsistent with the Council's, they have based those positions largely on the incorrect assumption that the levels necessary to protect the GPS service are not achievable. Alternatively, these parties may simply not understand, or may have chosen to ignore, the critical nature of GPS services. The Council notes that the appropriate criterion for the Commission to consider is the protection of GPS applications. Further, the Council points out that even OOBE levels as low as -110 dBW/MHz are noted by at least one commenter to be achievable for systems operating in the 776-794 MHz frequency band.

II. DISCUSSION

A. There Is Strong Support For The Adoption Of A Coherent Spectrum Management Approach.

In their comments in this proceeding, many other parties, in addition to the Council, have urged the Commission to adopt a harmonized spectrum policy that would ultimately result in the most efficient use of the scarce frequency resource. For example, the Industrial Telecommunications Association, Inc. ("ITA") believes that the

Commission must promote sound spectrum policy.[11] ArrayComm, Inc. ("ArrayComm") notes that innovation in new services can only be realized if the Commission adopts an appropriate interference management policy.[12] Similarly, Motorola Inc. believes that the Commission must promote proper spectrum management as such policy would protect other public safety systems.[13] Finally, the Telecommunications Industry Association ("TIA") also urges the Commission to adopt a coherent spectrum management approach.[14]

The recognition of these parties that the Commission must adopt a harmonized spectrum policy correlates with what the Council said in its Comments. The Council has observed that a piecemeal approach to the required protection of GPS from out-of-band emissions is not sufficient.[15] The Commission is currently considering the impact to the GPS band noise floor in various individual proceedings considering the introduction of new services.[16] What the Commission must recognize, however, is that

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11 *See* Comments of the Industrial Telecommunications Association, Inc. ("ITA") in WT Docket No. 99-168, at 4 (filed July 19, 1999).

12 *See* Comments of ArrayComm, Inc. in WT Docket No. 99-168, at 8 (filed July 19, 1999) ("ArrayComm Comments").

13 *See* Comments of Motorola Inc. in WT Docket No. 99-168, at 1, 2, 14 (filed July 19, 1999).

14 *See* Comments of the Telecommunications Industry Association ("TIA") in WT Docket No. 99-168, at 2 (filed July 16, 1999).

15 *See* Comments at 4-7.

16 In addition to the current NPRM, the Commission is considering the interference to GPS or the Council has raise the issue in the following proceedings:

a) *1998 Biennial Regulatory Review – Amendment of Parts 2, 25 and 68 of the Commission's Rules to Further Streamline the Equipment Authorization Process for Radio Frequency Equipment, Modify the Equipment Authorization Process for Telephone Terminal Equipment, Implement Mutual Regogniation Agreements and Begin Implementation of the Global Mobile Personal Communications by Satellite (GMPCS) Arrangements*, FCC 98-338, 13 FCC Rcd 24,687 (1998);

any protection criteria for GPS adopted in any one proceeding will not adequately protect GPS users because the cumulative impact of all proposed services and classes of emitters would be greater than the baseline established in each one of these separate proceedings. As the Council's Comments make clear, the Commission must take a broader perspective when it comes to protecting GPS and maximizing the utility of other services.[17]

Accordingly, the Commission should adopt a harmonized spectrum policy that considers the cumulative interference impact on the GPS noise floor from all relevant services. Only in this manner can the Commission rationally justify the OOBE criteria that it ultimately adopts for the protection of GPS. Short of a harmonized spectrum policy, the Commission's efforts in each of its independent proceedings are fruitless and will jeopardize the critical applications of GPS for millions of users that rely on it for safety-of-life applications.

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b) *Amendment of Parts 2 and 25 to Implement the Global Mobile Personal Communications by Satellite (GMPCS) Memorandum of Understanding and Arrangements; Petition of the National Telecommunications and Information Administration to Amend Part 25 of the Commission's Rules to Establish Emissions Limits for Mobile and Portable Earth Stations Operating in the 1610-1660.5 MHz Band*, FCC 99-37 (released March 5, 1999);

c) *The Establsihment of Policies and Service Rules for the Mobile-Satellite Service in the 2 GHz Band*, FCC 99-50 (released March 25, 1999);

d) *Reallocation of Television Channels 60-69, the 746-806 MHz Band*, FCC 97-421, 12 FCC Rcd 22, 953 (1998);

e) *The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements through the Year 2010; Establishment of Rules and Requirements for Priority Access Service*, FCC 97-373, 12 FCC Rcd 17, 706 (1997); and

f) *Revision of Part 15 of the Commission's Rules Regarding Ultra-Wideband Transmission System*; et Docket No. 98-153 (FCC 98-208), slip op. (released Sept. 1, 1998).

[17] *See* Comments at 7.

In short, while the Commission should adopt coherent spectrum policies to administer the scarce frequency spectrum across all bands, it is imperative, at a minimum, that the Commission abandon the piecemeal approach that considers protection criteria for GPS in isolation, without recognition of the overall impact of all OOBE on GPS. The Commission must adopt a consistent spectrum interference management approach that prevents the increase in the noise floor of the GPS frequency band and ultimately protects the GPS service.

B. There Is Clear Demonstration That A –70 dBW/MHz OOBE Level Is Not Appropriate – Studies Demonstrate That More Stringent Standards Are Necessary.

Most commenters did not oppose the Council's proposed "default" OOBE threshold of –100 dBW/MHz.[18] Moreover, only U.S. West, Inc. supported the Commission's proposed OOBE limits as appropriate,[19] and only ArrayComm explicitly supported the –70 dBW/MHz limit proposed by NTIA.[20] Other parties supported the proposed mask for OOBE without referencing any specific level for emissions falling in the GPS frequency band.[21] Harris Corporation ("Harris") offered support for the

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18 *See id.* at 5.

19 *See* Comments of U.S. West, Inc. in WT Docket No. 99-168, at 1 of Exhibit 1 (filed July 19, 1999).

20 *See* ArrayComm Comments at 9.

21 *See* Comments of SBC Communications, Inc. in WT Docket No. 99-168, at 5 (filed July 19, 1999); Comments of the International Association of Fire Chiefs, Inc. and the International Municipal Signal Association in WT Docket No. 99-168, at 2 (filed July 19, 1999).

Council's views, and urged the Commission to continue to protect the harmonic GPS bands to the –110 dB level.[22]

Consistent with the overall views expressed by commenters in this proceeding, the Council emphasizes that the proposed OOBE standards recommended by NTIA are inadequate and that it is essential that more stringent interference thresholds be adopted for the protection of GPS service. In its Comments, the Council established that the –70 dBW/MHz level is not a general protection criterion for GPS.[23] It further explained how the NTIA proposed levels were developed for a particular aviation scenario operating at a different band than the systems at issue in this proceeding.[24] Adoption of the NTIA levels in this proceeding at new frequencies would increase the noise floor in the GPS frequency band and would be devastating for critical safety-of-life GPS applications because GPS receivers would be unable to track and acquire the GPS signal.[25] The final levels proposed by NTIA can only be adopted at this time for OOBE from MSS mobile earth terminals operating in the 1-3 GHz; OOBE from any other emitter must be studied on a case-by-case basis.[26]

The Council also showed, citing the results of actual studies and demonstrations, that the *only* default level that can safely be established at this point in

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22 *See* Comments of Harris Corporation in WT Docket No. 99-168, at 3 (filed July 19, 1999) ("Harris Comments").

23 *See* Comments at 5 (citing studies and Comment of the U.S. Industry Council in IB Docket No. 99-67 (RM No. 9165) (filed June 21, 1999) ("GMPCS MoU Comments"), which were incorporated by reference and attached to the Comments).

24 *See* Comments at 3.

25 *See id.* at 4.

26 *See id.* at 5.

time is a wideband OOBE threshold limit of –100 dBW/MHz.[27] The Council made it clear that this is the "default" level that out-of-band emissions from transmission systems operating in the 776-794 MHz bands must comply with to protect the millions of GPS safety-of-life applications, absent case-by-case independent studies.[28] In support of these arguments, the Council incorporated by reference and attached to its Comments its comments on the *GMPCS MoU* proceeding – where the proposed OOBE levels for protection of GPS were based on the same NTIA recommendation used in the instant proceeding. The Council's *GMPCS MOU* Comments provided detailed explanation and technical studies to demonstrate the inability of a –70 dBW/MHz level – or any other level higher than –100 dBW/MHz – to protect GPS (except where there are specific case-by-case analysis that may provide for levels as high as –70 dBW/MHz).[29]

Therefore, given the demonstration by the Council that the levels recommended by NTIA of –70 dBW/MHz/-80 dBW/MHz are not adequate for the protection of GPS from emissions of systems operating in the 776-794 MHz band, the Commission should reject those comments that support the Commission's proposed levels. The commenters advocating these views have either failed to acknowledge and address all of the technical issues that were outlined in the Council's Comments and above, or have chosen to ignore the Commission's responsibility to protect the GPS frequency band.[30]

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27 *See id.*

28 *See id.*

29 *See* GMPCS MoU Comments at 15-16.

30 *See* White House, Office of Science and Technology Policy, National Security Council, Fact Sheet: U.S. Global Positioning System Policy, March 29, 1996, Pages 1-3 (Reference: Presidential Decision Directive NCTC-6); H.R. 105-746, Defense FY99

C. Comments In This Proceeding Clearly Demonstrate That More Stringent OOBE Thresholds Than –70 dBW/MHz Are Achievable To Protect The GPS Service.

AirTouch Communications, Inc. ("AirTouch") states that the proposed NTIA levels would be too stringent and makes reference to an alternate band plan that would preclude interference emissions into the GNSS frequencies.[31] The Council urges the Commission to consider any alternate band plan, as AirTouch suggests in its comments, that would prevent out-of-band emissions into the GPS bands. Alternate band plans that avoid harmonic emission into the GPS bands may be adopted as part of an omnibus spectrum management approach, as discussed in Section II.A above.

If alternate band plans are not practical, the Commission must require more stringent levels to protect GPS. In this regard, the Commission should disregard comments that assert, without valid foundation, that a –70 dBW/MHz level is too stringent. The appropriate consideration for the Commission is not whether a particular OOBE levels is too stringent, but whether the OOBE level is sufficient to protect the critical safety-of-life applications of GPS.

Further, the Commission must also reject comments asserting that the NTIA-proposed levels, or for that matter the Council-proposed levels, are too stringent to permit cost-effective production of equipment for service in the subject bands. The Council believes that a level of –100 dBW/MHz is achievable. In fact, at least one manufacturer of radio systems believes that 110 dB suppression of second harmonic emissions from transmitters operating on channels 65-67 falling on the GPS frequency

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Appropriations Conference Report; H.R. 1702 Commercial Space Act of 1998.

[31] *See* Comments of AirTouch Communications, Inc. in WT Docket No. 99-168, at 30 (filed July 19, 1999).

band is achievable through the use of a frequency "notch" filter.[32] The Council urges the Commission to require the use of a notch filter for transmitters in the 776-794 MHz frequency. This approach would keep marginal increases to the GPS noise floor at a minimum, and thereby relieve the cumulative problem from out-of-band emissions from other services and emitters that the Commission is considering.[33]

III. CONCLUSION

For the foregoing reasons, the Commission should adopt a comprehensive approach to developing suitable OOBE levels for all services that impact GPS. This approach is necessary because the current piecemeal approach will not ensure adequate protection and is thus likely to produce devastating effects on the GPS frequency bands, limiting or destroying the availability of GPS, and thus jeopardizing the millions of users that rely on GPS for safety-of-life applications. Comprehensive spectrum management is also consistent with the views of a significant number of commenters in this proceeding.

The only OOBE level that the Commission can safely adopt for emitters in the 776-794 MHz band that are under consideration in this rulemaking proceeding is –100 dBW/MHz. The Commission could only reasonably allow higher levels, up to –70 dBW/MHz, if detailed studies prove that such operation is feasible, taking into

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[32] *See* Harris Comments at 2-3.

[33] *See supra*, Section II.A.

consideration the particular operational characteristics and other factors detailed in the Council's initial Comments.[34]

Finally, while most parties did not oppose the Council's view that the NTIA-proposed OOBE levels are insufficient to protect GPS services, the Commission should disregard comments from those few commenters that assert that lower OOBE levels are not achievable. The Commission should recognize that its responsibility to protect GPS is the paramount consideration, and further, as shown in the comment phase of this proceeding, that there are devices that can meet the stricter OOBE levels proposed by the Council. Therefore, as part of a harmonized spectrum policy concerning protection for GPS, the Commission must reject the NTIA-proposed levels as the OOBE threshold for 776-794 MHz systems and require more stringent levels that truly shield GPS from harmful interference.

Respectfully submitted,

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August 13, 1999

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[34] *See* Comments at 8.

CERTIFICATE OF SERVICE

I, Tim Jordan, do hereby certify that copies of the foregoing "Reply Comments of The U.S. GPS Industry Council" were delivered this 13th day of August, 1999, to the following in the manner indicated:

VIA HAND DELIVERY

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